TEST REPORT

Product	:	Coolbox
Trade mark	:	Coolbox
Model/Type reference	:	CB-RED
Serial Number	:	N/A
Report Number	:	EED32H00168801
FCC ID	:	2AH8W-CB-RED
Date of Issue	:	Apr. 14, 2016
Test Standards	:	47 CFR Part 15 Subpart C (2015)
Test result	:	PASS

Prepared for:

Coolbox, LLC

16851 Saybrook Ln. Huntington Beach, CA 92649

Prepared by:

Centre Testing International Group Co., Ltd.
Hongwei Industrial Zone, Bao'an 70 District,
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Compiled by: Reviewed by:

Approved by: Date: Apr. 14, 2016

Sheek Luo

Lab manager

Check No.:2212805597

2 Version

Version No.	Date	Description
00	Apr. 14, 2016	Original

3 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	47 CFR Part 15, Subpart C Section 15.203/15.247 (c)	ANSI C63.10-2013	PASS
AC Power Line Conducted Emission	47 CFR Part 15, Subpart C Section 15.207	ANSI C63.10-2013	PASS
Conducted Peak Output Power	47 CFR Part 15, Subpart C Section 15.247 (b)(1)	ANSI C63.10-2013	PASS
20dB Occupied Bandwidth	47 CFR Part 15, Subpart C Section 15.247 (a)(1)	ANSI C63.10-2013	PASS
Carrier Frequencies Separation	47 CFR Part 15, Subpart C Section 15.247 (a)(1)	ANSI C63.10-2013	PASS
Hopping Channel Number	47 CFR Part 15, Subpart C Section 15.247 (b)	ANSI C63.10-2013	PASS
Dwell Time	47 CFR Part 15, Subpart C Section 15.247 (a)(1)	ANSI C63.10-2013	PASS
Pseudorandom Frequency Hopping Sequence	47 CFR Part 15, Subpart C Section 15.247(b)(4)&TCB Exclusion List (7 July 2002)	ANSI C63.10-2013	PASS
RF Conducted Spurious Emissions	47 CFR Part 15, Subpart C Section 15.247(d)	ANSI C63.10-2013	PASS
Radiated Spurious emissions	47 CFR Part 15, Subpart C Section 15.205/15.209	ANSI C63.10-2013	PASS

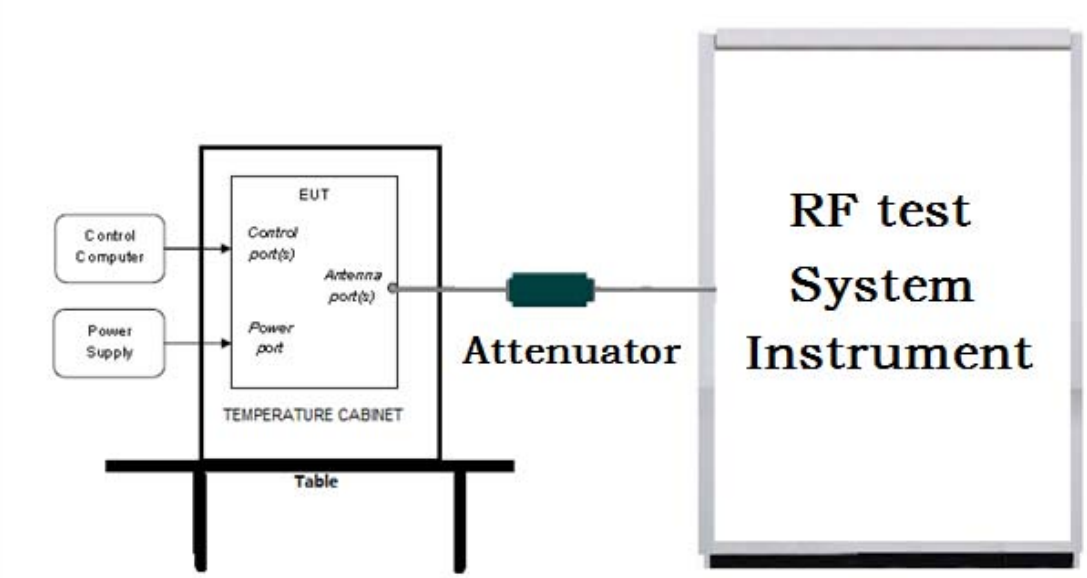
Remark:
The tested sample(s) and the sample information are provided by the client.

4 Content

5 Test Requirement

5.1 Test setup

5.1.1 For Conducted test setup



5.1.2 For Radiated Emissions test setup

Radiated Emissions setup:

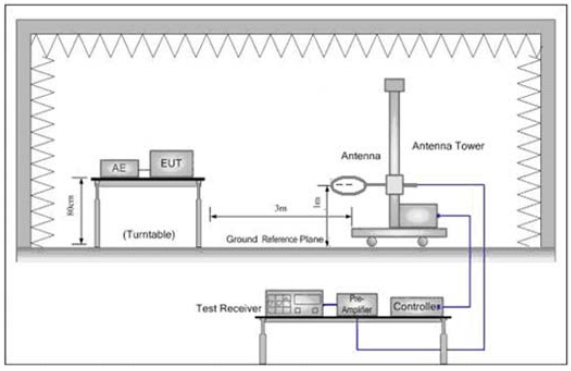


Figure 1. Below 30MHz

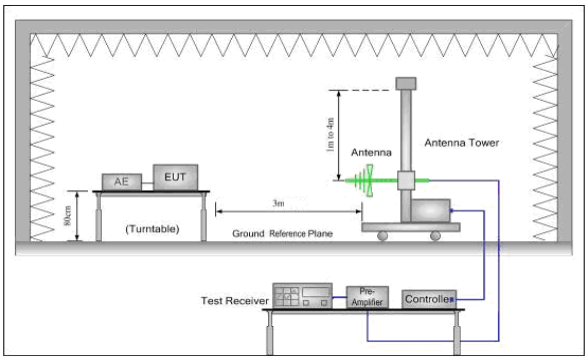


Figure 2. 30MHz to 1GHz

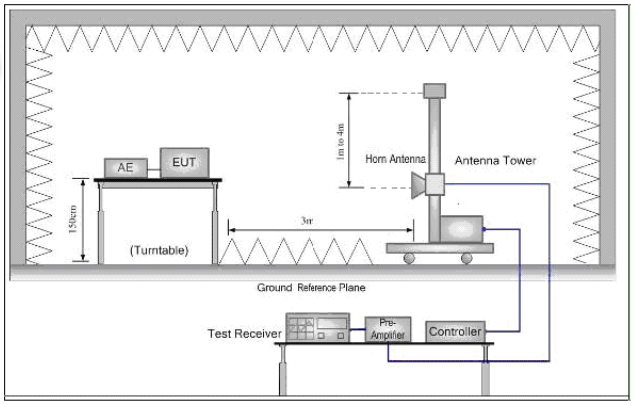
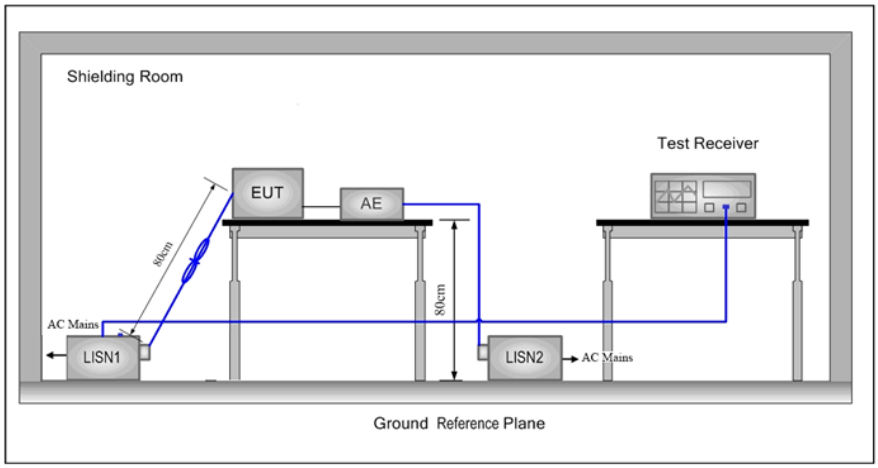


Figure 3. Above 1GHz

5.1.3 For Conducted Emissions test setup

Conducted Emissions setup



5.2 Test Environment

Operating Environment:	
Temperature:	24 °C
Humidity:	50 % RH
Atmospheric Pressure:	1010mbar

5.3 Test Condition

Test Mode	Tx/Rx	RF Channel		
		Low(L)	Middle(M)	High(H)
GFSK/π/4DQPSK/ 8DPSK(DH1,DH3,DH5)	2402MHz ~2480 MHz	Channel 1	Channel 40	Channel79
		2402MHz	2441MHz	2480MHz
Transmitting mode:	The EUT transmitted the continuous modulation test signal at the specific channel(s)			

Test mode:

Pre-scan under all rate at lowest channel 1

Mode	**GFSK**		
packets	**1-DH1**	**1-DH3**	**1-DH5**
EIRP(dBm)	5.489	5.300	5.536
Mode	π/4DQPSK		
packets	**2-DH1**	**2-DH3**	**2-DH5**
EIRP(dBm)	3.188	3.210	4.556
Mode	8DPSK		
packets	**3-DH1**	**3-DH3**	**3-DH5**
EIRP(dBm)	3.278	3.310	4.782

Through Pre-scan, 1-DH5 packet the power is the worst case of GFSK, 2-DH5 packet the power is the worst case ofπ/4DQPSK, 3-DH5 packet the power is the worst case of 8DPSK.

6 General Information

6.1 Client Information

Applicant:	Coolbox, LLC
Address of Applicant:	16851 Saybrook Ln. Huntington Beach, CA 92649
Manufacturer:	JIANFA ELECTRICAL MANUFACTURES (SHENZHEN) CO., LTD.
Address of Manufacturer:	NO.74 GUXU YILU, XIXIANG TOWN, BAOAN, SHENZHEN, GUANGDONG, 518126, CHINA

6.2 General Description of EUT

Product Name:	Coolbox
Model No.(EUT):	CB-RED
Tark Mark:	Coolbox
EUT Supports Radios application:	Bluetooth V3.0
Power Supply:	AC 120V, 60Hz
Sample Received Date:	Oct.12, 2015
Sample tested Date:	Oct.12, 2015 to Apr. 14, 2016

6.3 Product Specification subjective to this standard

Operation Frequency:	2402MHz~2480MHz
Bluetooth Version:	BT 3.0
Modulation Type:	Bluetooth V3.0(GFSK/π/4DQPSK/ 8DPSK(DH1,DH3,DH5)
Number of Channel:	79
Test Software of EUT:	CSR BlueTest3 (manufacturer declare)
Test Power Grade:	50 (manufacturer declare)
Antenna Gain:	0dBi
Antenna Type:	Integral
Test Voltage:	AC 120V, 60HZ

Operation Frequency each of channel

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2402MHz	21	2422MHz	41	2442MHz	61	2462MHz
2	2403MHz	22	2423MHz	42	2443MHz	62	2463MHz
3	2404MHz	23	2424MHz	43	2444MHz	63	2464MHz
4	2405MHz	24	2425MHz	44	2445MHz	64	2465MHz
5	2406MHz	25	2426MHz	45	2446MHz	65	2466MHz
6	2407MHz	26	2427MHz	46	2447MHz	66	2467MHz
7	2408MHz	27	2428MHz	47	2448MHz	67	2468MHz
8	2409MHz	28	2429MHz	48	2449MHz	68	2469MHz
9	2410MHz	29	2430MHz	49	2450MHz	69	2470MHz
10	2411MHz	30	2431MHz	50	2451MHz	70	2471MHz

11	2412MHz	31	2432MHz	51	2452MHz	71	2472MHz
12	2413MHz	32	2433MHz	52	2453MHz	72	2473MHz
13	2414MHz	33	2434MHz	53	2454MHz	73	2474MHz
14	2415MHz	34	2435MHz	54	2455MHz	74	2475MHz
15	2416MHz	35	2436MHz	55	2456MHz	75	2476MHz
16	2417MHz	36	2437MHz	56	2457MHz	76	2477MHz
17	2418MHz	37	2438MHz	57	2458MHz	77	2478MHz
18	2419MHz	38	2439MHz	58	2459MHz	78	2479MHz
19	2420MHz	39	2440MHz	59	2460MHz	79	2480MHz
20	2421MHz	40	2441MHz	60	2461MHz		

6.4 Description of Support Units

The EUT has been tested with associated equipment below

Description	Manufacturer	Model No.	Certification	Supplied by
Mobile phone	SAMSUNG	GT-I9082i	FCC ID	CTI

6.5 Test Location

All tests were performed at:

Centre Testing International Group Co., Ltd.

Hongwei Industrial Zone, Bao'an 70 District, Shenzhen, Guangdong, China518101

Telephone: +86 (0) 755 33683668 Fax:+86 (0) 755 33683385

No tests were sub-contracted.

6.6 Test Facility

The test facility is recognized,certified, or accredited by the following organizations:

CNAS-Lab Code: L1910

Centre Testing International Group Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories..

A2LA-Lab Cert. No. 3061.01

Centre Testing International Group Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

FCC-Registration No.: 565659

Centre Testing International Group Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Registration 565659.

IC-Registration No.: 7408A

The 3m Alternate Test Site of Centre Testing International Group Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 7408A .

IC-Registration No.: 7408B

The 10m Alternate Test Site of Centre Testing International Group Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 7408B.

NEMKO-Aut. No.: ELA503

Centre Testing International Group Co., Ltd. has been assessed the quality assurance system, the testing facilities, qualifications and testing practices of the relevant parts of the organization. The quality assurance system of the Laboratory has been validated against ISO/IEC 17025 or equivalent. The laboratory also fulfils the conditions described in Nemko Document NLA-10.

VCCI

The Radiation 3 &10 meters site of Centre Testing International Group Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-4096.

Main Ports Conducted Interference Measurement of Centre Testing International Group Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: C-4563.

Telecommunication Ports Conducted Disturbance Measurement of Centre Testing International Group Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: T-2146.

The Radiation 3 meters site of Centre Testing International Group Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-758

6.7 Deviation from Standards

None.

6.8 Abnormalities from Standard Conditions

None.

6.9 Other Information Requested by the Customer

None.

6.10 Measurement Uncertainty(95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	Radio Frequency	7.9×10^{-8}
2	RF power, conducted	0.31dB (30MHz-1GHz)
		0.57dB(1GHz-18GHz)
3	Radiated Spurious emission test	4.5dB (30MHz-1GHz)
		4.8dB(1GHz-12.75GHz)
4	Conduction emission	3.6dB (9kHz to 150kHz)
		3.2dB (150kHz to 30MHz)
5	Temperature test	0.64°C
6	Humidity test	2.8%
7	DC power voltages	0.025%

7 Equipment List

RF test system					
Equipment	**Manufacturer**	**Mode No.**	**Serial Number**	**Cal. Date (mm-dd-yyyy)**	**Cal. Due date (mm-dd-yyyy)**
Signal Generator	Keysight	E8257D	MY53401106	04-14-2015	04-13-2016
Signal Generator	Keysight	E8257D	MY53401106	04-01-2016	03-31-2017
Communication test set test set	Agilent	N4010A	MY47230124	04-02-2015	04-01-2016
Communication test set test set	Agilent	N4010A	MY51400230	04-01-2016	03-31-2017
Spectrum Analyzer	Keysight	N9010A	MY54510339	04-01-2015	03-31-2016
Spectrum Analyzer	Keysight	N9010A	MY54510339	04-01-2016	03-31-2017
Signal Generator	Keysight	N5182B	MY53051549	03-31-2015	03-30-2016
Signal Generator	Keysight	N5182B	MY53051549	04-01-2016	03-31-2017
High-pass filter(3-18GHz)	Sinoscite	FL3CX03WG18 NM12-0398-002	---	01-13-2015	01-12-2016
High-pass filter(3-18GHz)	Sinoscite	FL3CX03WG18 NM12-0398-002	---	01-12-2016	01-11-2017
High-pass filter(5-18GHz)	MICRO-TRONICS	SPA-F-63029-4	---	01-13-2015	01-12-2016
High-pass filter(5-18GHz)	MICRO-TRONICS	SPA-F-63029-4	---	01-12-2016	01-11-2017
band rejection filter (GSM900)	Sinoscite	FL5CX01CA09C L12-0395-001	---	01-13-2015	01-12-2016
band rejection filter (GSM900)	Sinoscite	FL5CX01CA09C L12-0395-001	---	01-12-2016	01-11-2017
band rejection filter (GSM850)	Sinoscite	FL5CX01CA08C L12-0393-001	---	01-13-2015	01-12-2016
band rejection filter (GSM850)	Sinoscite	FL5CX01CA08C L12-0393-001	---	01-12-2016	01-11-2017
band rejection filter (GSM1800)	Sinoscite	FL5CX02CA04C L12-0396-002	---	01-13-2015	01-12-2016
band rejection filter (GSM1800)	Sinoscite	FL5CX02CA04C L12-0396-002	---	01-12-2016	01-11-2017
band rejection filter (GSM1900)	Sinoscite	FL5CX02CA03C L12-0394-001	---	01-13-2015	01-12-2016
band rejection filter (GSM1900)	Sinoscite	FL5CX02CA03C L12-0394-001	---	01-12-2016	01-11-2017
DC Power	Keysight	E3642A	MY54436035	03-31-2015	03-30-2016
DC Power	Keysight	E3642A	MY54436035	04-01-2016	03-31-2017
PC-1	Lenovo	R4960d	---	04-01-2015	03-31-2016
PC-1	Lenovo	R4960d	---	04-01-2016	03-31-2017
BT&WI-FI Automatic control	R&S	OSPB157	101374	04-01-2015	03-31-2016
BT&WI-FI Automatic control	R&S	OSP120	101374	04-01-2016	03-31-2017
RF control unit	JS Tonscend	JS0806-2	2015860006	04-01-2015	03-31-2016

RF control unit	JS Tonscend	JS0806-2	158060006	04-01-2016	03-31-2017
BT&WI-FI Automatic test software	JS Tonscend	JSTS1120-2	---	04-01-2015	03-31-2016
BT&WI-FI Automatic test software	JS Tonscend	JSTS1120-2	---	04-01-2016	03-31-2017

3M Semi/full-anechoic Chamber					
Equipment	**Manufacturer**	**Mode No.**	**Serial Number**	**Cal. date (mm-dd-yyyy)**	**Cal. Due date (mm-dd-yyyy)**
3M Chamber	TDK	SAC-3	---	06-02-2013	06-01-2016
TRILOG Broadband Antenna	schwarzbeck	VULB9163	9163-617	07-31-2015	07-29-2016
Microwave Preamplifier	Agilent	8449B	3008A02425	02-05-2015	02-04-2016
Microwave Preamplifier	Agilent	8449B	3008A02425	02-04-2016	02-03-2017
Horn Antenna	ETS-LINDGREN	3117	00057410	06-30-2015	06-28-2018
Loop Antenna	ETS	6502	00071730	07-30-2015	07-28-2017
Spectrum Analyzer	R&S	FSP40	100416	06-30-2015	06-28-2016
Receiver	R&S	ESCI	100435	06-30-2015	06-28-2016
Multi device Controller	maturo	NCD/070/10711112	---	01-13-2015	01-12-2016
Multi device Controller	maturo	NCD/070/10711112	---	01-12-2016	01-11-2017
LISN	schwarzbeck	NNBM8125	81251547	06-30-2015	06-28-2016
LISN	schwarzbeck	NNBM8125	81251548	06-30-2015	06-28-2016
Signal Generator	Agilent	E4438C	MY45095744	04-19-2015	04-18-2016
Signal Generator	Keysight	E8257D	MY53401106	04-14-2015	04-13-2016
Signal Generator	Keysight	E8257D	MY53401106	04-01-2016	03-31-2017
Temperature/ Humidity Indicator	TAYLOR	1451	1905	07- 08-2015	07-06-2016
Communication test set	Agilent	E5515C	GB47050533	04-27-2015	04-26-2016
Cable line	Fulai(7M)	SF106	5219/6A	01-13-2015	01-12-2016
Cable line	Fulai(7M)	SF106	5219/6A	01-12-2016	01-11-2017
Cable line	Fulai(6M)	SF106	5220/6A	01-13-2015	01-12-2016
Cable line	Fulai(6M)	SF106	5220/6A	01-12-2016	01-11-2017
Cable line	Fulai(3M)	SF106	5216/6A	01-13-2015	01-12-2016
Cable line	Fulai(3M)	SF106	5216/6A	01-12-2016	01-11-2017
Cable line	Fulai(3M)	SF106	5217/6A	01-13-2015	01-12-2016
Cable line	Fulai(3M)	SF106	5217/6A	01-12-2016	01-11-2017
Communication test set	R&S	CMW500	152394	04-19-2015	04-18-2016
High-pass filter(3-18GHz)	Sinoscite	FL3CX03WG18NM 12-0398-002	---	01-13-2015	01-12-2016

High-pass filter(3-18GHz)	Sinoscite	FL3CX03WG18NM 12-0398-002	---	01-12-2016	01-11-2017
High-pass filter(5-18GHz)	MICRO-TRONICS	SPA-F-63029-4	---	01-13-2015	01-12-2016
High-pass filter(5-18GHz)	MICRO-TRONICS	SPA-F-63029-4	---	01-12-2016	01-11-2017
band rejection filter	Sinoscite	FL5CX01CA09CL1 2-0395-001	---	01-13-2015	01-12-2016
band rejection filter	Sinoscite	FL5CX01CA09CL1 2-0395-001	---	01-12-2016	01-11-2017
band rejection filter	Sinoscite	FL5CX01CA08CL1 2-0393-001	---	01-13-2015	01-12-2016
band rejection filter	Sinoscite	FL5CX01CA08CL1 2-0393-001	---	01-12-2016	01-11-2017
band rejection filter	Sinoscite	FL5CX02CA04CL1 2-0396-002	---	01-13-2015	01-12-2016
band rejection filter	Sinoscite	FL5CX02CA04CL1 2-0396-002	---	01-12-2016	01-11-2017
band rejection filter	Sinoscite	FL5CX02CA03CL1 2-0394-001	---	01-13-2015	01-12-2016
band rejection filter	Sinoscite	FL5CX02CA03CL1 2-0394-001	---	01-12-2016	01-11-2017

Conducted disturbance Test					
Equipment	**Manufacturer**	**Mode No.**	**Serial Number**	**Cal. date (mm-dd-yyyy)**	**Cal. Due date (mm-dd-yyyy)**
Receiver	R&S	ESCI	100009	06-30-2015	06-28-2016
Temperature/ Humidity Indicator	Belida	TT-512	101	07-09-2015	07-07-2016
Communication test set	Agilent	E5515C	GB47050533	04-27-2015	04-26-2016
Communication test set	R&S	CMW500	152394	04-19-2015	04-18-2016
LISN	R&S	ENV216	100098	06-30-2015	06-28-2016
LISN	schwarzbeck	NNLK8121	8121-529	06-30-2015	06-28-2016
Voltage Probe	R&S	ESH2-Z3	100042	07-09-2014	07-08-2017
Current Probe	R&S	EZ17	100106	07-09-2014	07-08-2017
ISN	TESEQ GmbH	ISN T800	30297	01-29-2015	01-27-2017

8 Radio Technical Requirements Specification

Reference documents for testing:

No.	Identity	Document Title
1	FCC Part15C (2015)	Subpart C-Intentional Radiators
2	ANSI C63.10-2013	American National Standard for Testing Unlicesed Wireless Devices

Test Results List:

Test requirement	Test method	Test item	Verdict	Note
Part15C Section 15.247 (a)(1)	ANSI 63.10	20dB Occupied Bandwidth	PASS	Appendix A)
Part15C Section 15.247 (a)(1)	ANSI 63.10	Carrier Frequencies Separation	PASS	Appendix B)
Part15C Section 15.247 (a)(1)	ANSI 63.10	Dwell Time	PASS	Appendix C)
Part15C Section 15.247 (b)	ANSI 63.10	Hopping Channel Number	PASS	Appendix D)
Part15C Section 15.247 (b)(1)	ANSI 63.10	Conducted Peak Output Power	PASS	Appendix E)
Part15C Section 15.247(d)	ANSI 63.10	Band-edge for RF Conducted Emissions	PASS	Appendix F)
Part15C Section 15.247(d)	ANSI 63.10	RF Conducted Spurious Emissions	PASS	Appendix G)
Part15C Section 15.247 (a)(1)	ANSI 63.10	Pseudorandom Frequency Hopping Sequence	PASS	Appendix H)
Part15C Section 15.203/15.247 (c)	ANSI 63.10	Antenna Requirement	PASS	Appendix I)
Part15C Section 15.207	ANSI 63.10	AC Power Line Conducted Emission	PASS	Appendix J)
Part15C Section 15.205/15.209	ANSI 63.10	Restricted bands around fundamental frequency (Radiated) Emission)	PASS	Appendix K)
Part15C Section 15.205/15.209	ANSI 63.10	Radiated Spurious Emissions	PASS	Appendix L)

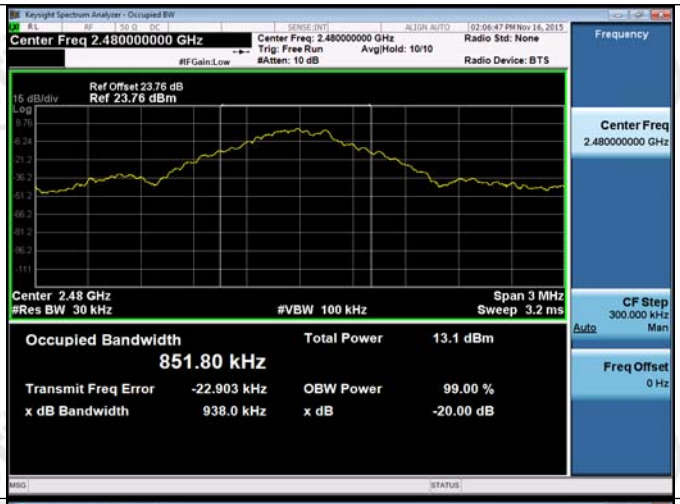
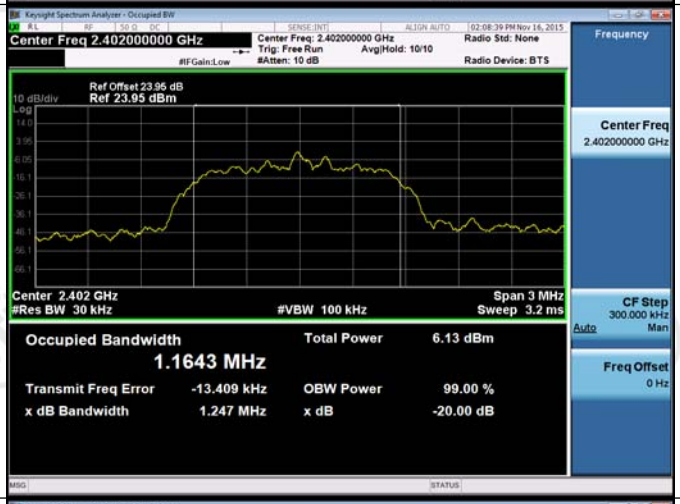
Appendix A): 20dB Occupied Bandwidth

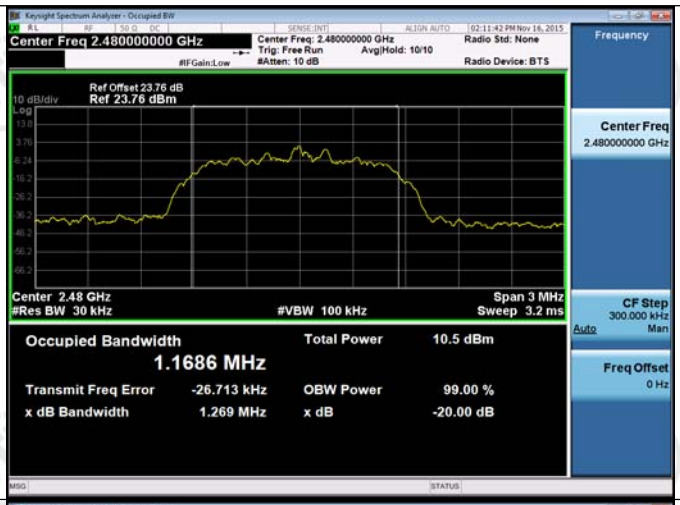
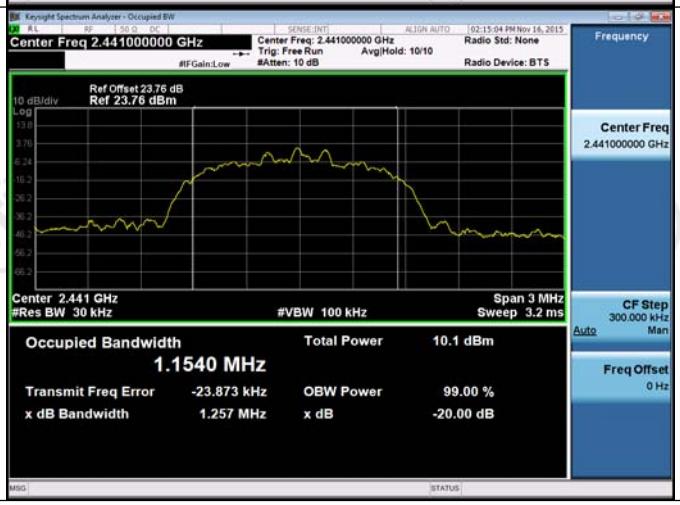
Test Result

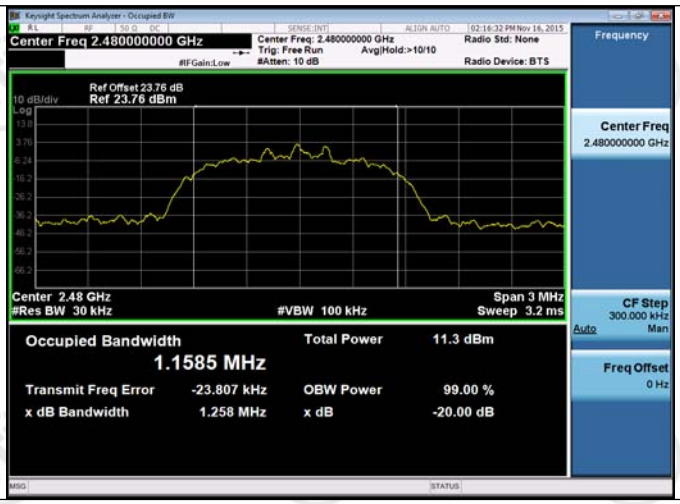
Mode	Channel.	20dB Bandwidth [MHz]	99% OBW [MHz]	Verdict	Remark
GFSK	LCH	0.9433	0.86217	PASS	Peak detector
GFSK	MCH	0.9417	0.85634	PASS	
GFSK	HCH	0.9380	0.85180	PASS	
π/4DQPSK	LCH	1.247	1.1643	PASS	
π/4DQPSK	MCH	1.227	1.1625	PASS	
π/4DQPSK	HCH	1.269	1.1686	PASS	
8DPSK	LCH	1.273	1.1583	PASS	
8DPSK	MCH	1.257	1.1540	PASS	
8DPSK	HCH	1.258	1.1585	PASS	

Test Graph

Graphs			
GFSK/LCH			
GFSK/MCH			

GFSK/HCH			
π/4DQPSK/LCH			
π/4DQPSK/MCH			

π/4DQPSK/HCH			
8DPSK/LCH			
8DPSK/MCH			

8DPSK/HCH	 Keysight Spectrum Analyzer - Occupied BW Center Freq 2.480000000 GHz Center Freq: 2.480000000 GHz Trig: Free Run Avg|Hold:>10/10 #Atten: 10 dB Radio Std: None Radio Device: BTS Frequency Ref Offset 23.76 dB 10 dB/div Ref 23.76 dBm Log Center Freq 2.480000000 GHz Center 2.48 GHz #Res BW 30 kHz #VBW 100 kHz Span 3 MHz Sweep 3.2 ms CF Step 300.000 kHz Auto Man Occupied Bandwidth 1.1585 MHz Total Power 11.3 dBm Transmit Freq Error -23.807 kHz OBW Power 99.00 % x dB Bandwidth 1.258 MHz x dB -20.00 dB Freq Offset 0 Hz MSG STATUS	

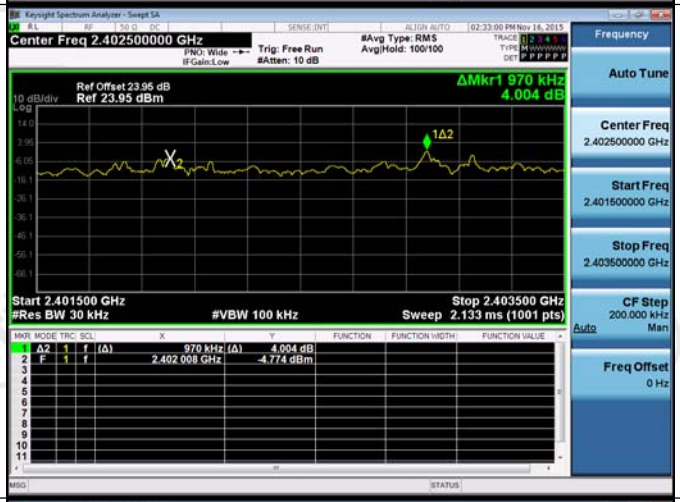
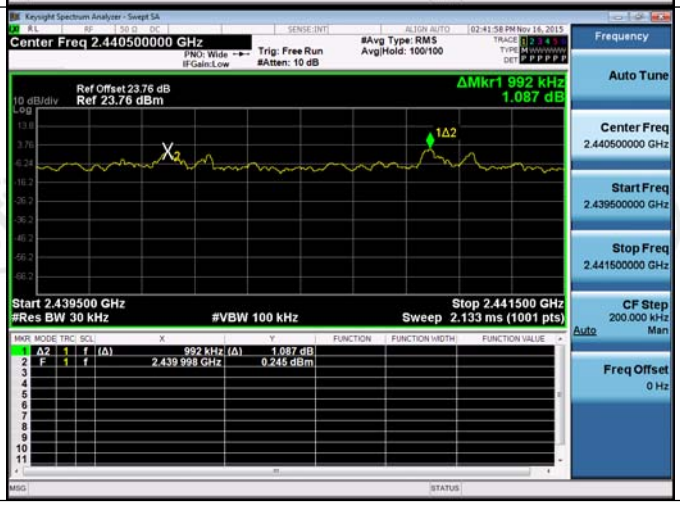
Appendix B): Carrier Frequency Separation

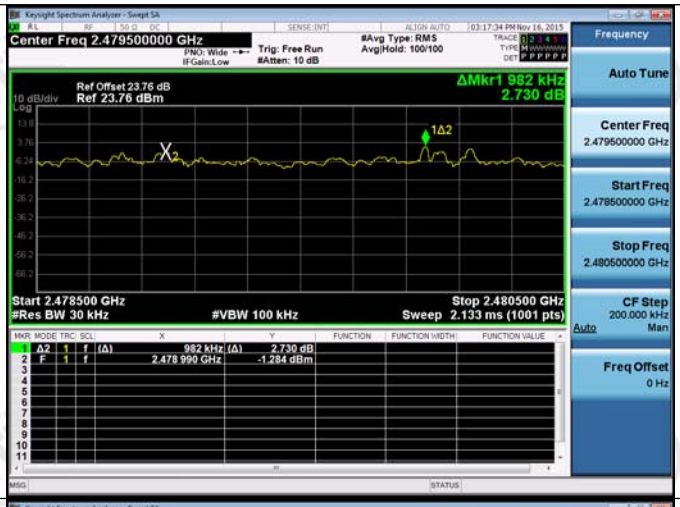
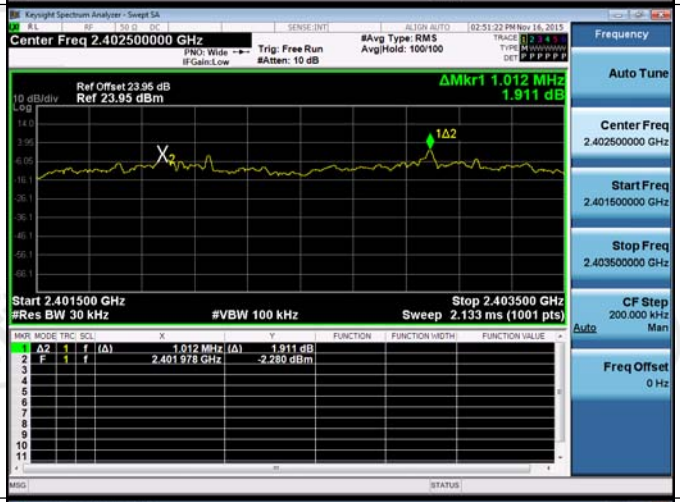
Result Table

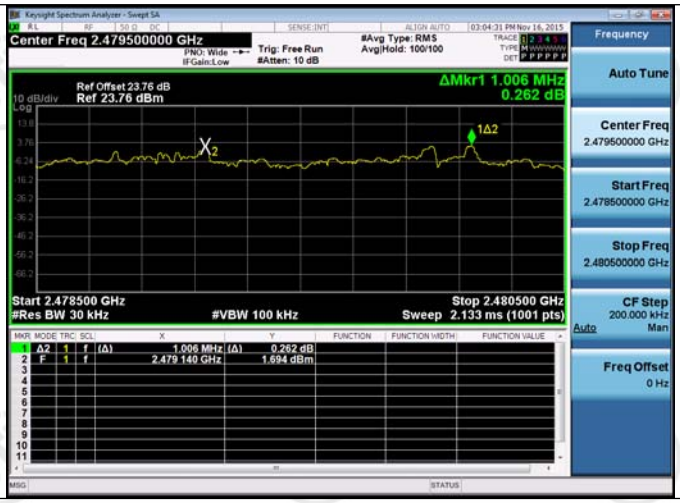
Mode	Channel.	Carrier Frequency Separation [MHz]	Verdict
GFSK	LCH	1.040	PASS
GFSK	MCH	1.008	PASS
GFSK	HCH	1.148	PASS
π/4DQPSK	LCH	0.970	PASS
π/4DQPSK	MCH	0.992	PASS
π/4DQPSK	HCH	0.982	PASS
8DPSK	LCH	1.012	PASS
8DPSK	MCH	1.012	PASS
8DPSK	HCH	1.006	PASS

Test Graph

Graphs		
GFSK/LCH		
GFSK/MCH		

GFSK/HCH		
π/4DQPSK/LCH		
π/4DQPSK/MCH		

π/4DQPSK/HCH		
8DPSK/LCH		
8DPSK/MCH		

8DPSK/HCH		

Keysight Spectrum Analyzer - Swept SA
Center Freq 2.479500000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 10 dB
#Avg Type: RMS
Avg|Hold: 100/100
03:04:31 PM Nov 16, 2015
Frequency
Ref Offset 23.76 dB
10 dB/div
Ref 23.76 dBm
ΔMkr1 1.006 MHz
0.262 dB
1Δ2
Auto Tune
Center Freq
2.479500000 GHz
Start Freq
2.478500000 GHz
Stop Freq
2.480500000 GHz
CF Step
200.000 kHz
Auto
Man
Freq Offset
0 Hz
Start 2.478500 GHz
#Res BW 30 kHz
#VBW 100 kHz
Stop 2.480500 GHz
Sweep 2.133 ms (1001 pts)
1 Δ2 1 f (Δ) 1.006 MHz (Δ) 0.262 dB
2 F 1 f 2.479 140 GHz 1.694 dBm
MSG
STATUS

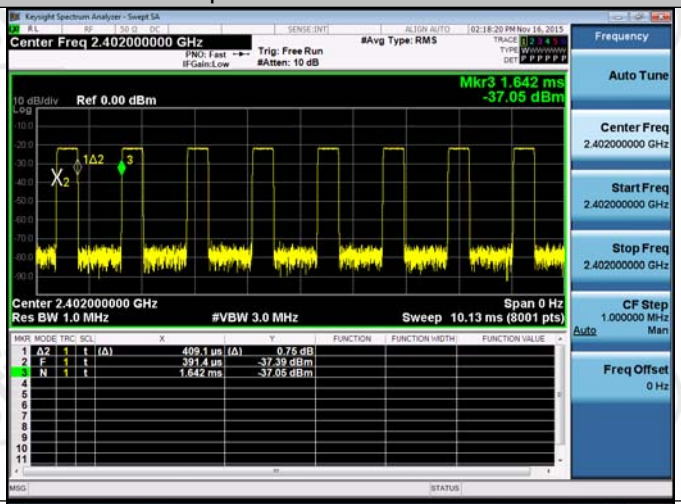
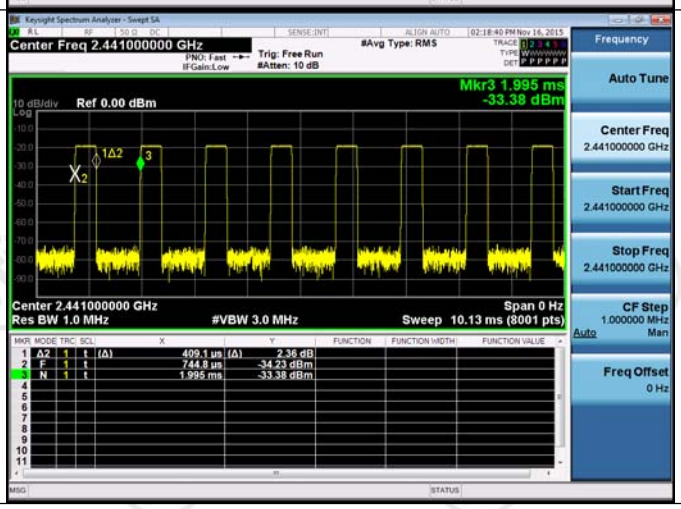
Appendix C): Dwell Time

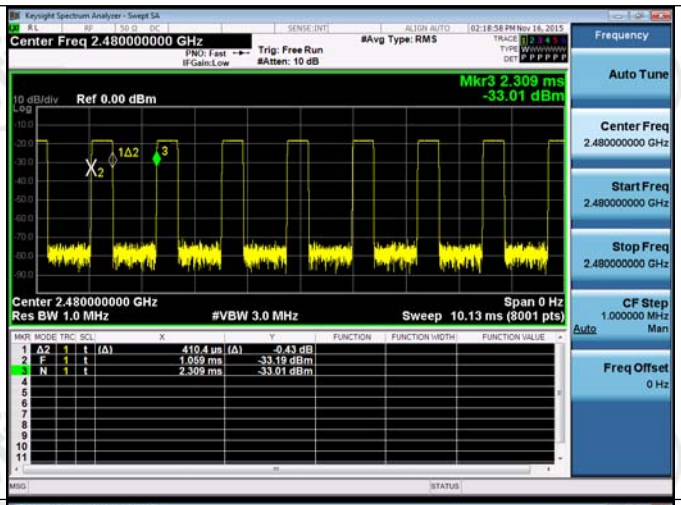
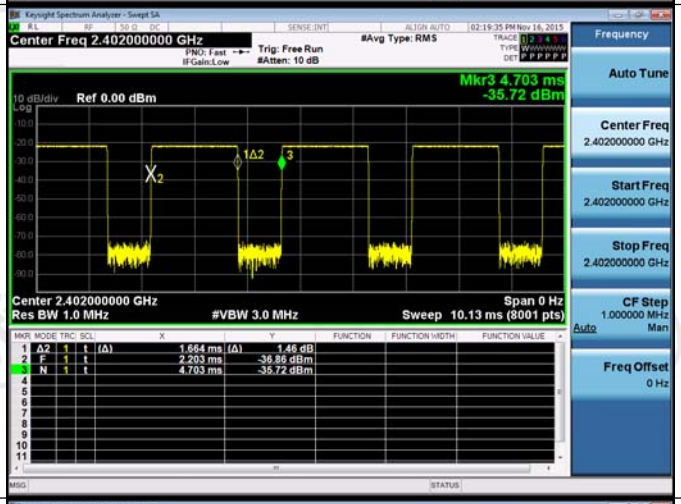
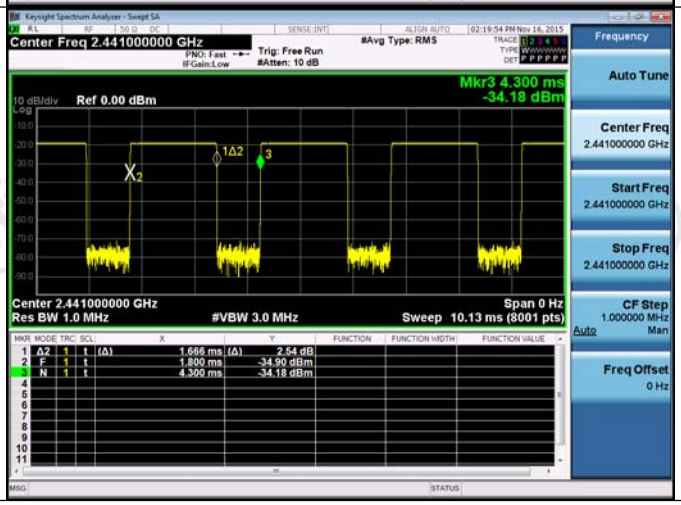
Result Table

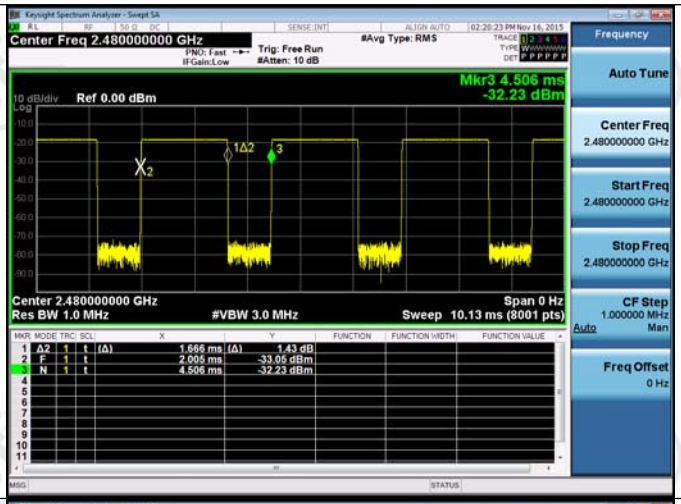
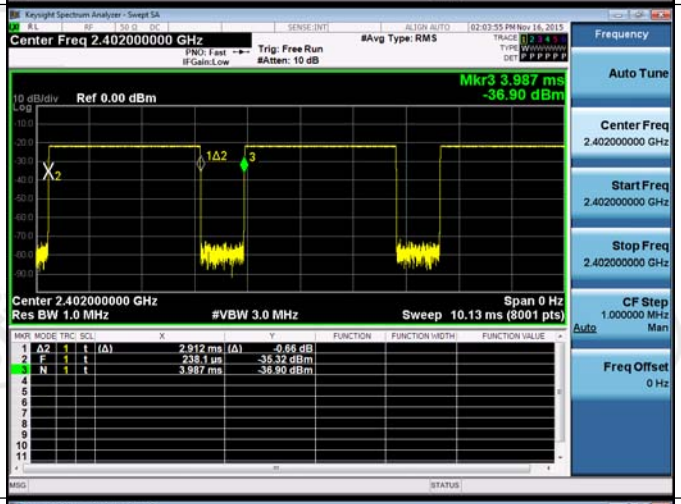
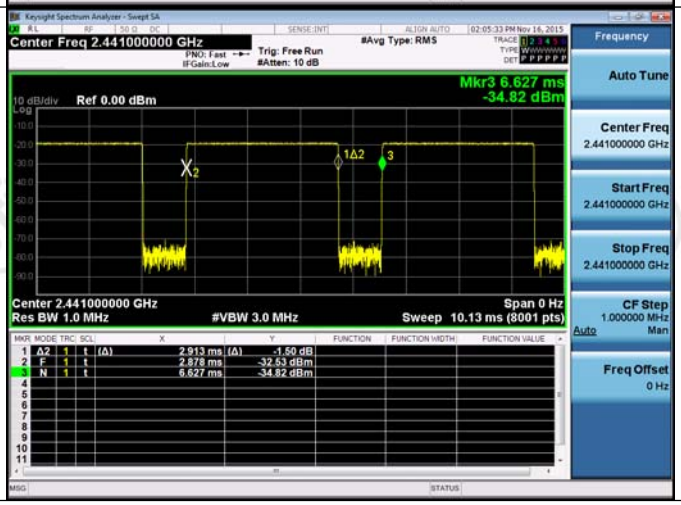
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops [hop*ch]	Dwell Time[s]
GFSK	DH1	LCH	0.409	320	0.131
GFSK	DH1	MCH	0.409	320	0.131
GFSK	DH1	HCH	0.41	320	0.131
GFSK	DH3	LCH	1.664	160	0.266
GFSK	DH3	MCH	1.666	160	0.267
GFSK	DH3	HCH	1.666	160	0.267
GFSK	DH5	LCH	2.912	106.7	0.311
GFSK	DH5	MCH	2.913	106.7	0.311
GFSK	DH5	HCH	2.913	106.7	0.311

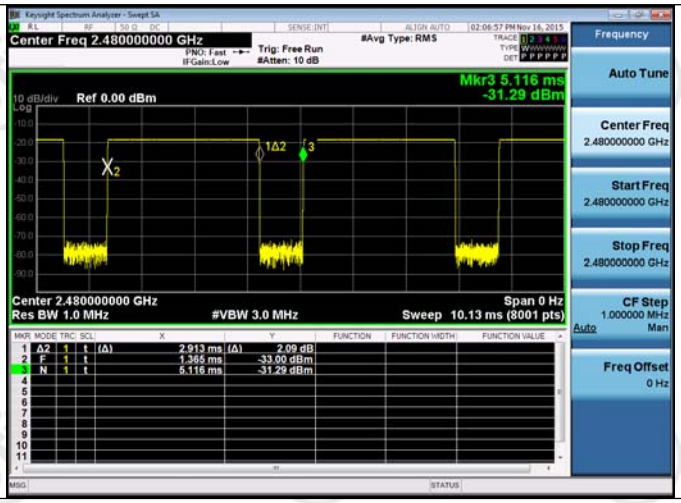
Remark : All modes are tested, only the worst mode GFSK is reported.

Test Graph

Graphs		
GFSK_DH1/LCH		
GFSK_DH1/MCH		

GFSK_DH1/HCH		
GFSK_DH3/LCH		
GFSK_DH3/MCH		

GFSK_DH3/HCH		
GFSK_DH5/LCH		
GFSK_DH5/MCH		

GFSK_DH5/HCH		

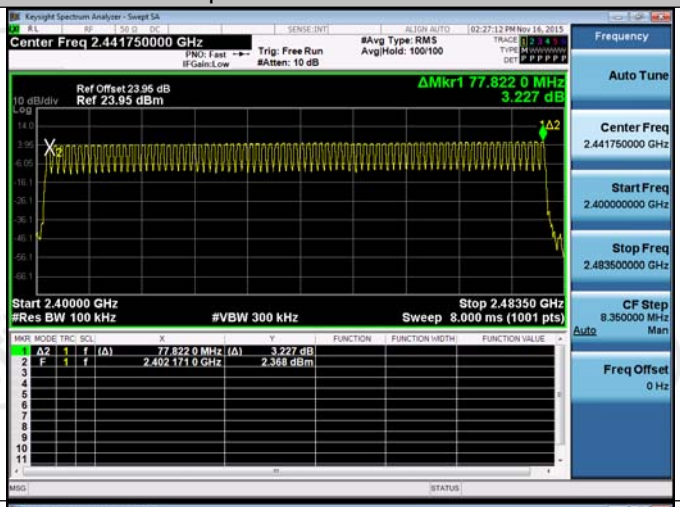
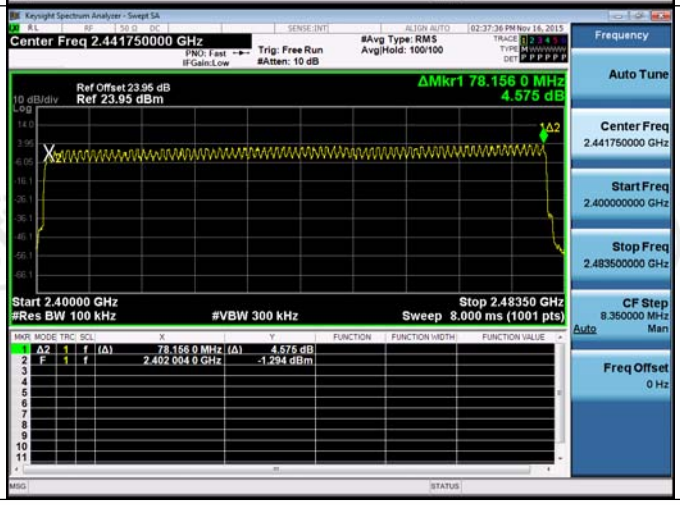
Center Freq 2.480000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 10 dB
#Avg Type: RMS
Frequency
Auto Tune
Mkr3 5.116 ms
-31.29 dBm
10 dB/div
Ref 0.00 dBm
Center Freq
2.480000000 GHz
Start Freq
2.480000000 GHz
Stop Freq
2.480000000 GHz
CF Step
1.000000 MHz
Auto
Man
Freq Offset
0 Hz
Center 2.480000000 GHz
Res BW 1.0 MHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 10.13 ms (8001 pts)
1 Δ2 1 t (Δ) 2.913 ms (Δ) 2.09 dB
2 F 1 t 1.365 ms -33.00 dBm
3 N 1 t 5.116 ms -31.29 dBm

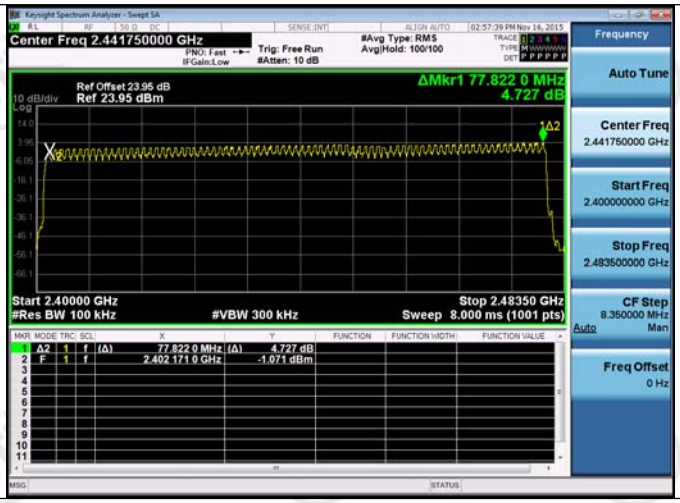
Appendix D): Hopping Channel Number

Result Table

Mode	Channel.	Number of Hopping Channel	Verdict
GFSK	Hop	79	PASS
π/4DQPSK	Hop	79	PASS
8DPSK	Hop	79	PASS

Test Graph

Graphs			
GFSK/Hop			
π/4DQPSK/Hop			

8DPSK/Hop		

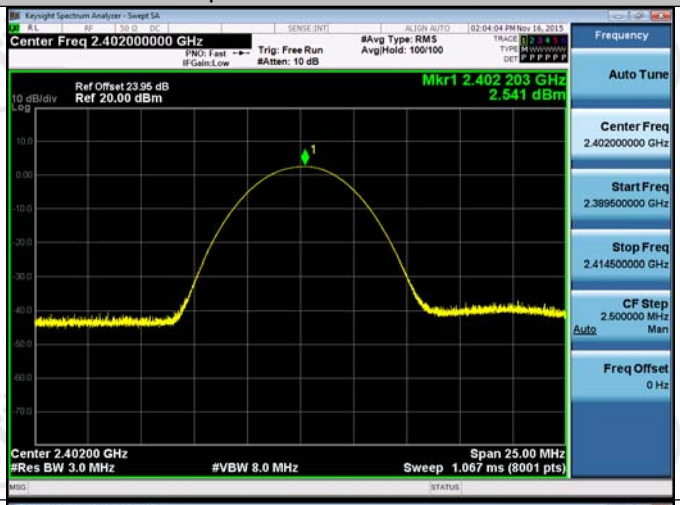
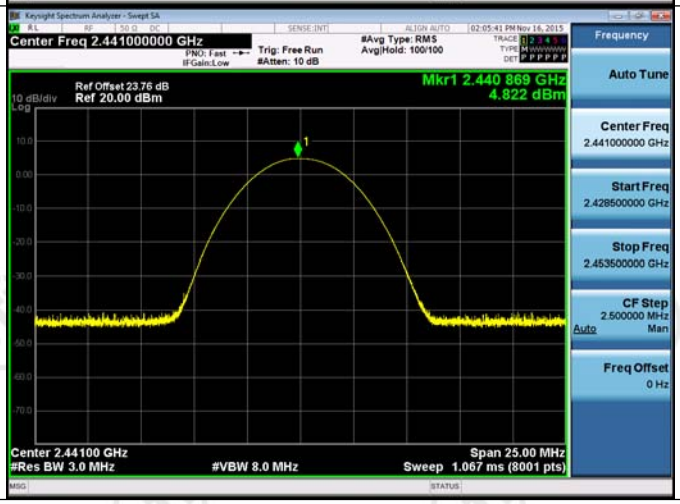
Keysight Spectrum Analyzer - Swept SA
Center Freq 2.441750000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 10 dB
#Avg Type: RMS
Avg|Hold: 100/100
02:57:39 PM Nov 16, 2015
Frequency
Ref Offset 23.95 dB
10 dB/div
Ref 23.95 dBm
ΔMkr1 77.822 0 MHz
4.727 dB
Auto Tune
Center Freq
2.441750000 GHz
Start Freq
2.400000000 GHz
Stop Freq
2.483500000 GHz
CF Step
8.350000 MHz
Auto
Man
Freq Offset
0 Hz
Start 2.40000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.48350 GHz
Sweep 8.000 ms (1001 pts)
1 Δ2 1 f (Δ) 77.822 0 MHz (Δ) 4.727 dB
2 F 1 f 2.402.171 0 GHz -1.071 dBm
MSG
STATUS

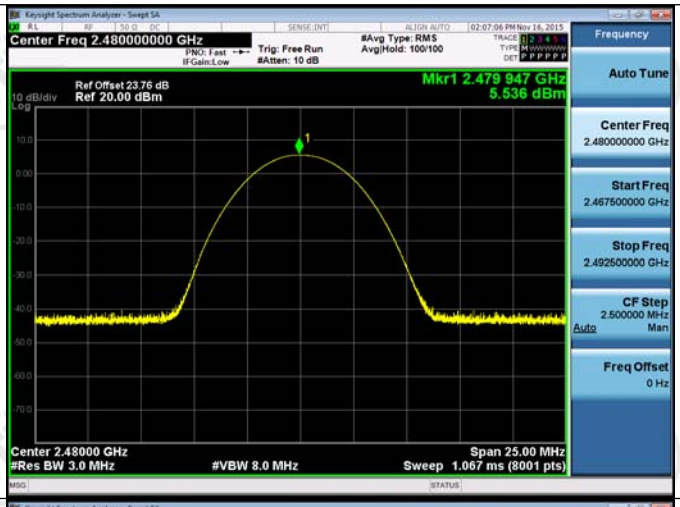
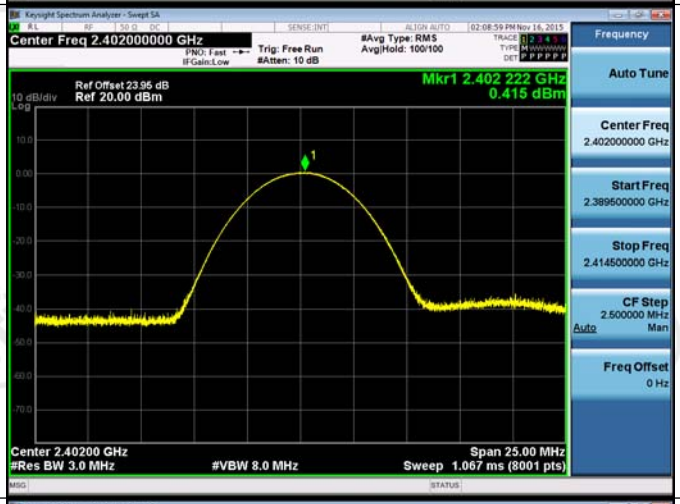
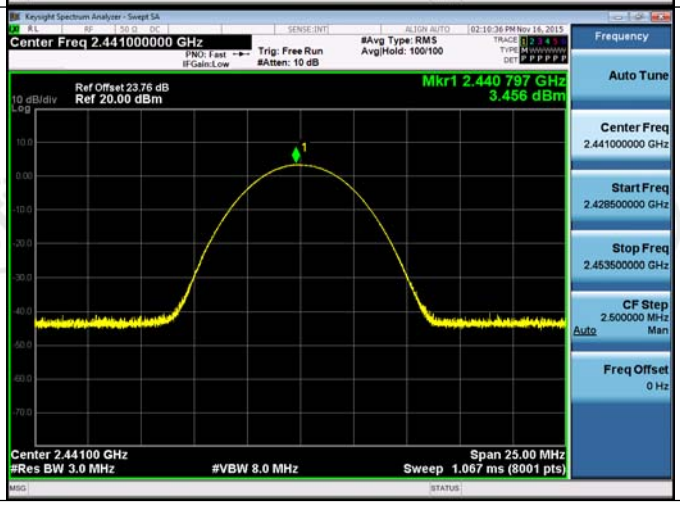
Appendix E): Conducted Peak Output Power

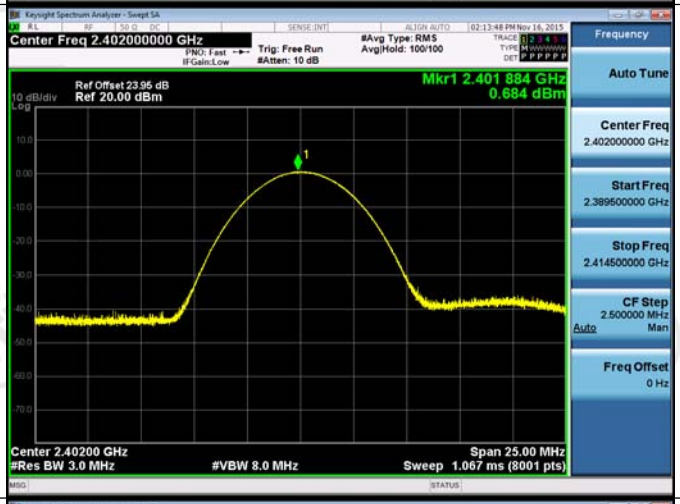
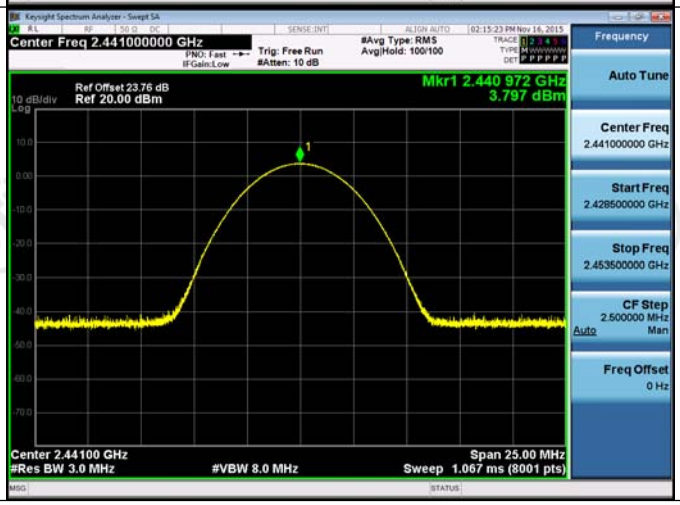
Result Table

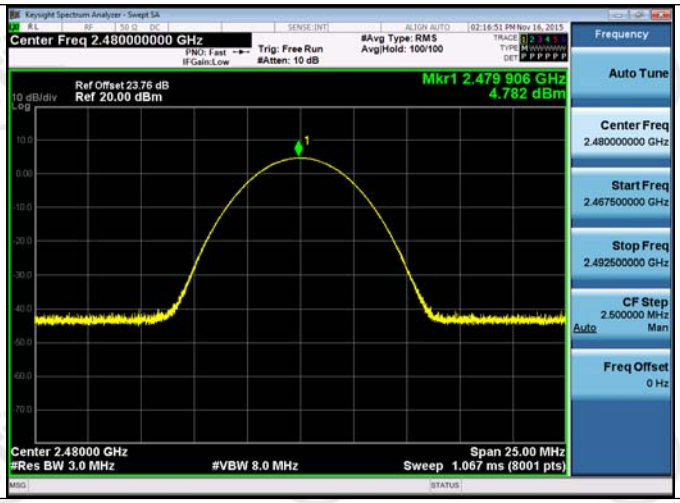
Mode	Channel.	Maximum Peak Output Power [dBm]	Verdict
GFSK	LCH	2.541	PASS
GFSK	MCH	4.822	PASS
GFSK	HCH	5.536	PASS
π/4DQPSK	LCH	0.415	PASS
π/4DQPSK	MCH	3.456	PASS
π/4DQPSK	HCH	4.556	PASS
8DPSK	LCH	0.684	PASS
8DPSK	MCH	3.797	PASS
8DPSK	HCH	4.782	PASS

Test Graph

Graphs		
GFSK/LCH		
GFSK/MCH		

GFSK/HCH			
π/4DQPSK/LCH			
π/4DQPSK/MCH			

π/4DQPSK/HCH			
8DPSK/LCH			
8DPSK/MCH			

8DPSK/HCH	

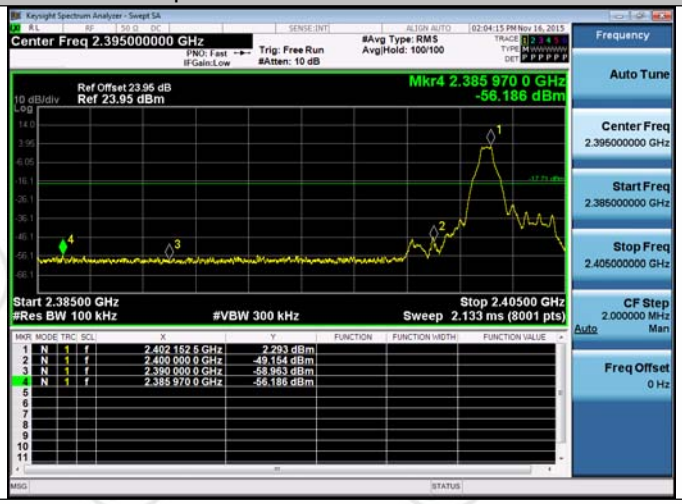
Keysight Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 10 dB
#Avg Type: RMS
Avg|Hold: 100/100
02:16:51 PM Nov 16, 2015
Ref Offset 23.76 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 2.479 906 GHz
4.782 dBm
Center 2.48000 GHz
#Res BW 3.0 MHz
#VBW 8.0 MHz
Span 25.00 MHz
Sweep 1.067 ms (8001 pts)
Frequency
Auto Tune
Center Freq
2.480000000 GHz
Start Freq
2.467500000 GHz
Stop Freq
2.492500000 GHz
CF Step
2.500000 MHz
Auto
Man
Freq Offset
0 Hz

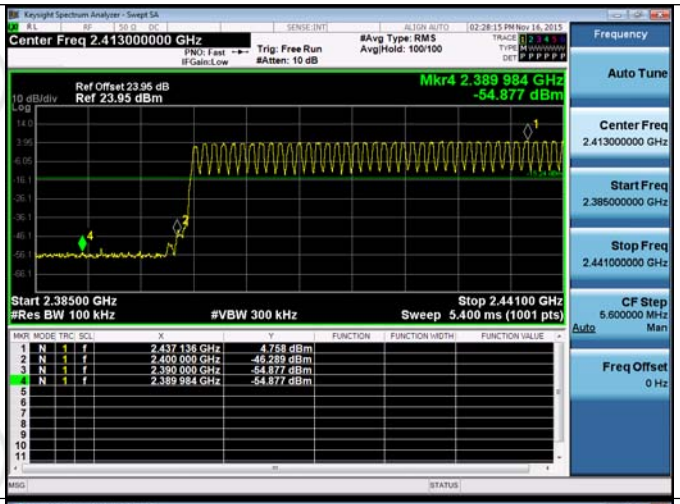
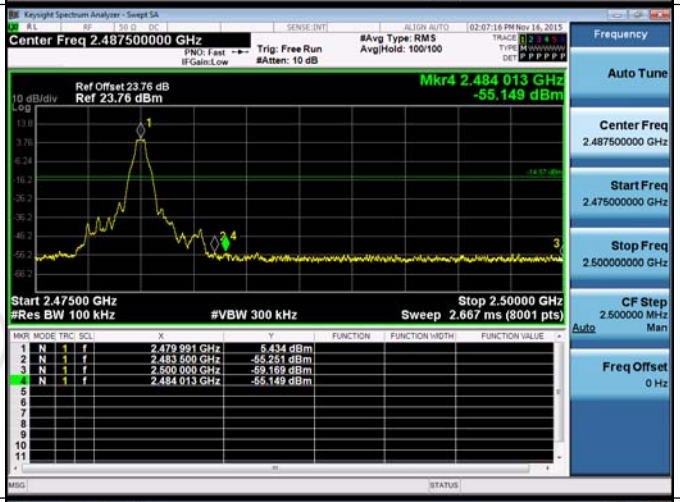
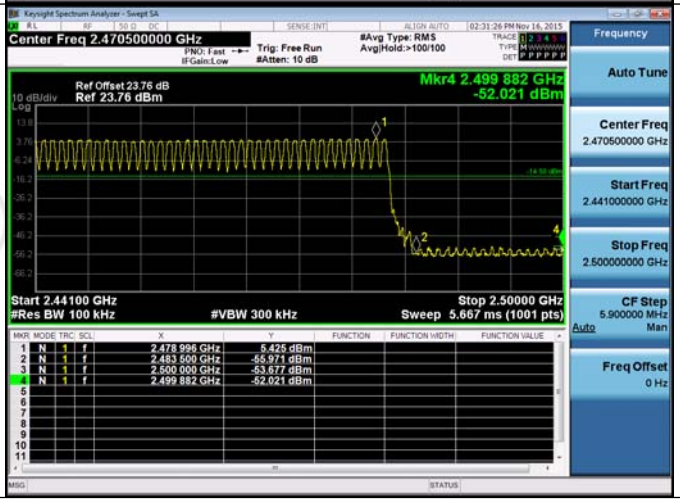
Appendix F): Band-edge for RF Conducted Emissions

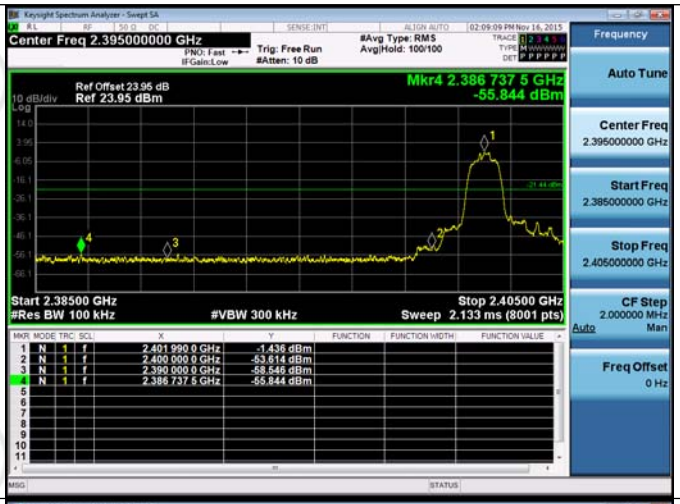
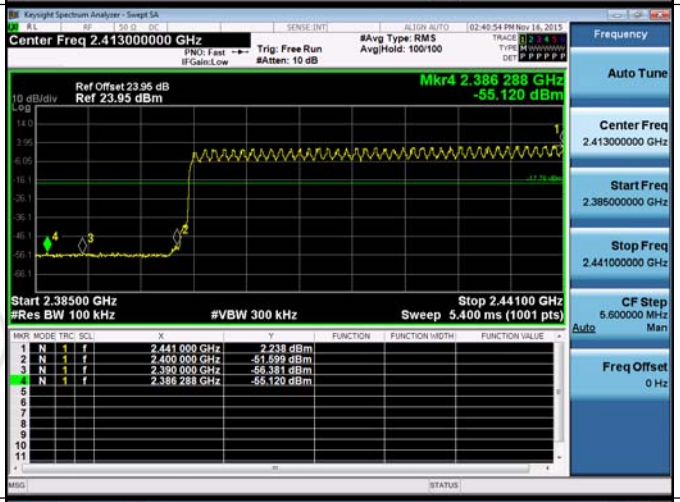
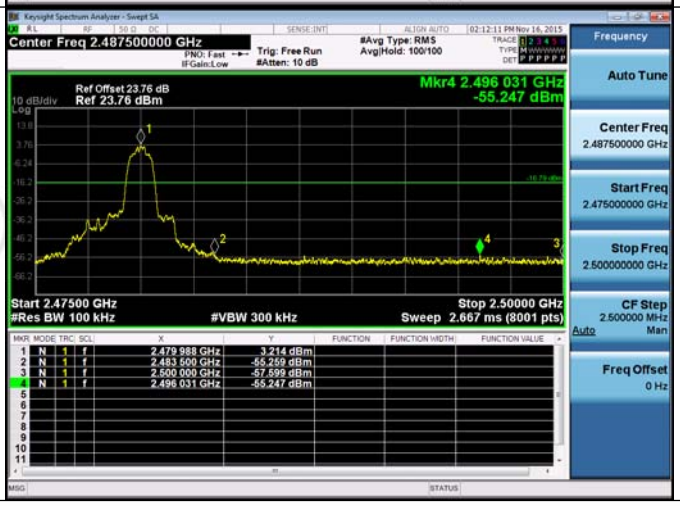
Result Table

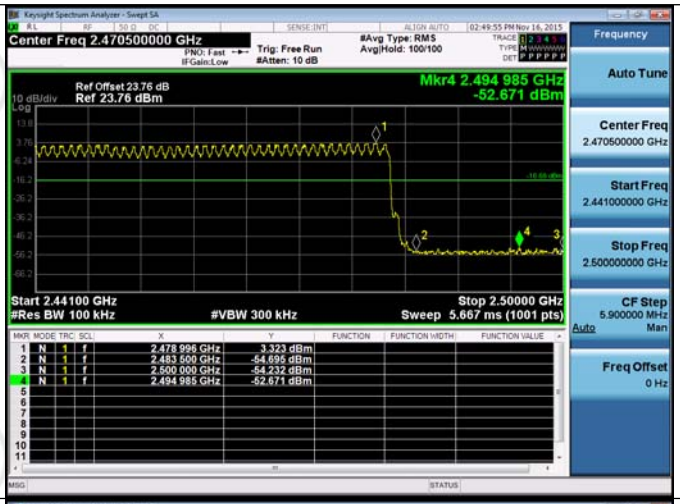
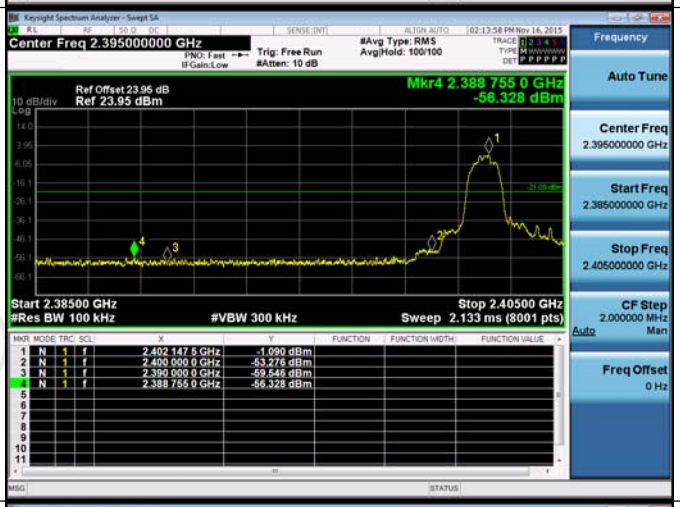
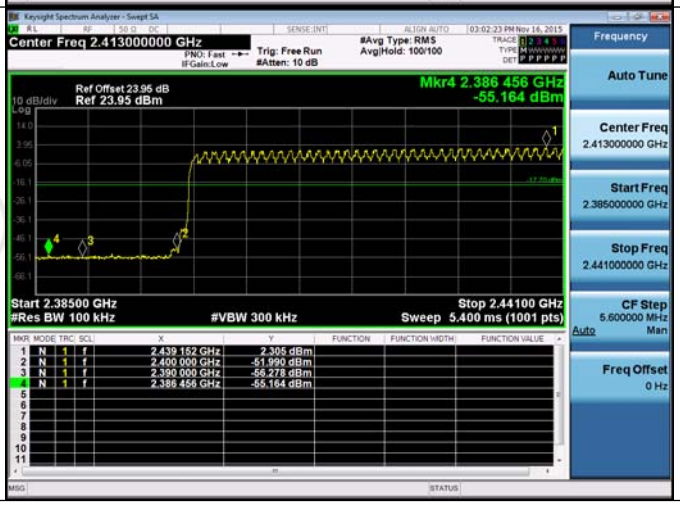
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	2.293	Off	-56.186	-17.71	PASS
			2.426	On	-54.877	-17.57	PASS
GFSK	HCH	2480	5.434	Off	-55.149	-14.57	PASS
			5.425	On	-52.021	-14.58	PASS
π/4DQPSK	LCH	2402	-1.436	Off	-55.844	-21.44	PASS
			0.238	On	-55.120	-17.76	PASS
π/4DQPSK	HCH	2480	3.214	Off	-55.247	-16.79	PASS
			3.323	On	-52.671	-16.68	PASS
8DPSK	LCH	2402	-1.090	Off	-56.328	-21.09	PASS
			0.305	On	-55.164	-17.7	PASS
8DPSK	HCH	2480	3.321	Off	-54.208	-16.68	PASS
			3.476	On	-53.138	-16.52	PASS

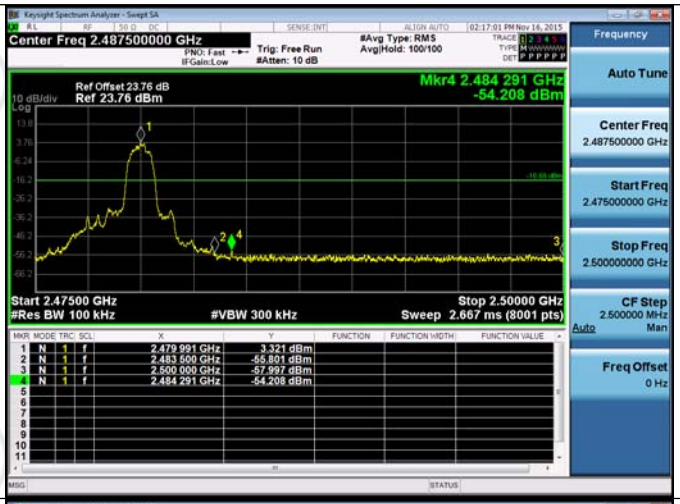
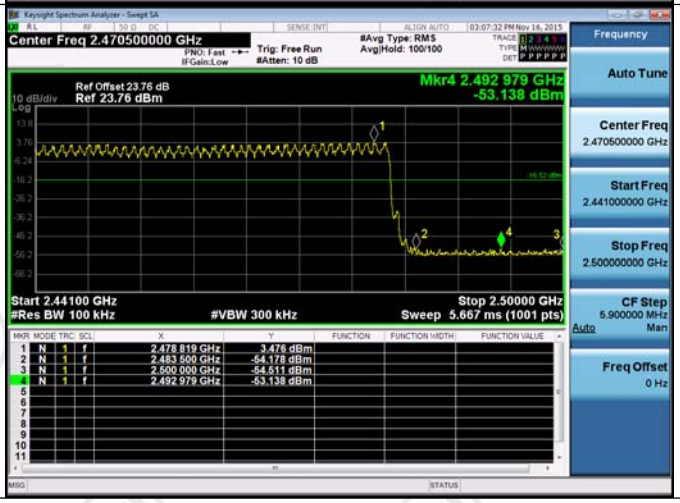
Test Graph

Graphs	
GFSK/LCH/No Hop	

GFSK/LCH/Hop		
GFSK/HCH/No Hop		
GFSK/HCH/Hop		

π/4DQPSK/LCH/No Hop		
π/4DQPSK/LCH/Hop		
π/4DQPSK/HCH/No Hop		

π/4DQPSK/HCH/Hop		
8DPSK/LCH/No Hop		
8DPSK/LCH/Hop		

8DPSK/HCH/No Hop		
8DPSK/HCH/Hop		

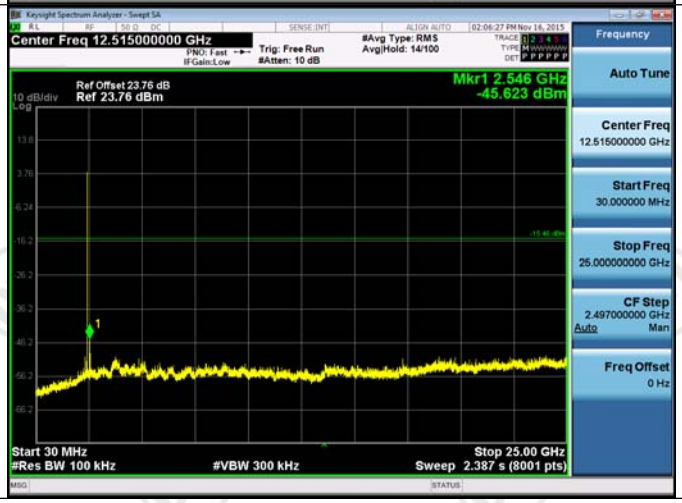
Appendix G): RF Conducted Spurious Emissions

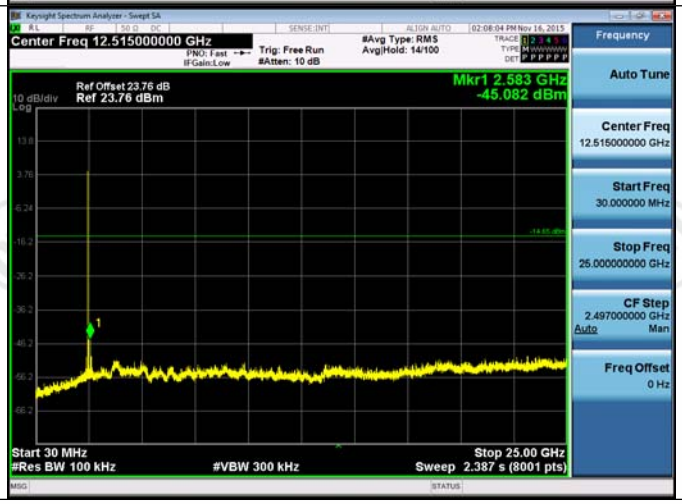
Result Table

Mode	Channel	Pref [dBm]	Puw[dBm]	Verdict
GFSK	LCH	2.126	<Limit	PASS
GFSK	MCH	4.542	<Limit	PASS
GFSK	HCH	5.355	<Limit	PASS
π/4DQPSK	LCH	-1.521	<Limit	PASS
π/4DQPSK	MCH	1.939	<Limit	PASS
π/4DQPSK	HCH	3.245	<Limit	PASS
8DPSK	LCH	-1.414	<Limit	PASS
8DPSK	MCH	2.081	<Limit	PASS
8DPSK	HCH	3.378	<Limit	PASS

Test Graph

GFSK_LCH_Graphs		
Pref		
Puw		

GFSK_MCH_Graphs			
Pref			
Puw			

GFSK_HCH_Graphs			
Pref			
Puw			

π/4DQPSK_LCH_Graphs			
Pref			
Puw